GUARDIANS OF THE SEA – MARITIME SAFETY AND SECURITY

Knowledge Partner

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Guardians of the Sea: Maritime Safety and Security

Setting the Course: A New Vision for Safer Seas

Maritime safety and security form the bedrock of global trade and economic stability. With over 90% of international trade carried by sea, safeguarding maritime routes is not merely a strategic necessity—it is an imperative for sustainable development. India's growing maritime footprint, coupled with its ambitions under *Maritime India Vision 2030*, demands a renewed focus on strengthening both its technological and human capital foundations.

This session—**"Guardians of the Sea"**—brings together two critical themes:

i. *Navigating Safely – Building Smart, Secure, and Sovereign Seaways*
ii. *Anchoring Excellence – Empowering Seafarers for Safe and Secure Seas.*

Together, these themes outline an integrated approach that merges innovation, governance, and human development to ensure that India's maritime future remains both secure and sustainable.

1 Smart Navigation: Building Secure and Sovereign Seaways

1.1 Harnessing Technology for Safer Navigation

Modern maritime operations depend on sophisticated surveillance, communication, and decision-support systems. Advanced platforms such as the **Long-Range Identification and Tracking (LRIT)** and **Automatic Identification Systems (AIS)** provide real-time data on vessel movement, assisting authorities in monitoring and managing maritime traffic efficiently.

Artificial Intelligence (AI) and data analytics now play a transformative role—detecting anomalies, forecasting weather disruptions, and predicting risks such as piracy, smuggling, and environmental hazards. Through AI-enabled predictive insights, maritime authorities can enhance situational awareness, enabling faster and more informed responses to potential threats.

1.2 Defending Digital Harbors: The Cybersecurity Imperative

The rapid digitization of ports, logistics systems, and onboard operations has introduced unprecedented vulnerabilities. Cyberattacks on ship navigation systems or port networks can paralyze trade and endanger lives at sea. To mitigate these risks, a **multi-layered cybersecurity architecture**—comprising real-time threat monitoring, network segmentation, and advanced encryption—must be integrated into every level of maritime governance.

Building cyber resilience also demands capacity-building within maritime organizations. Continuous cybersecurity drills, simulation-based threat response training, and international information-sharing mechanisms are essential to safeguard digital maritime ecosystems.

1.3 Preparedness in Motion: Strengthening Emergency and Incident Management

Every minute counts during maritime emergencies—whether responding to an oil spill, fire, collision, or medical evacuation. A robust response mechanism requires coordination between the **Directorate General of Shipping (DGS)**, **Indian Coast Guard (ICG)**,**Indian Navy** (IN) IFC-IOR and **port authorities**.

Developing and periodically reviewing **Standard Operating Procedures (SOPs)** ensures that all agencies operate seamlessly and effectively under pressure. Regular joint drills, both national and international, foster interoperability and readiness, ensuring that India's maritime forces can respond swiftly to both natural and man-made contingencies.

1.4 Collaborative Security: Expanding Maritime Domain Awareness

Mercantile Marine Domain Awareness Centre (MMDAC), which hosts the **LRIT Data Centre** and the **DG Communication Centre (DGCOMM Centre)** is a Critical Information Infrastructure which endeavours to provide response in case of maritime emergencies including casualties, natural disasters such as cyclones etc. by coordinating with various Authorities, Agencies and other stakeholders such as ICG, Port Authority, Indian Navy, Ship Owners Associations, etc.

The centre coordinates with the Indian Navy, Indian Coast Guard and other international organizations to ensure transparency in vessel movement, enabling early detection of illicit activities. The **Information Fusion Centre – Indian Ocean Region (IFC-IOR)** and the **Maritime Rescue Coordination Centre (MRCC)**, further contributes to India's maritime interest.

1.5 Policy and Governance: Modernizing Maritime Regulations

A secure maritime future depends on a sound regulatory foundation. The Merchant Shipping Act, 2025, redefines India's maritime governance by embedding digital compliance, e-registration, and automated certification systems to ensure transparency and efficiency. The Act strengthens administrative capacity through the creation of the Directorate General of Marine Administration and codifies international responsibilities under conventions such as MARPOL, MLC, SOLAS, the Nairobi Wreck Removal Convention, and the Bunker Oil Convention. It empowers the Central Government with delegated rule-making authority to frame regulations on Marine Incident and Emergency Response, Wreck and Salvage, Liability and Compensation for bunker oil pollution, and other emerging maritime concerns, areas previously absent from the 1958 framework. By consolidating the Act, the new law delivers clarity, reduces compliance burden, and advances India's shift toward a data-driven, globally aligned, and resilient maritime regulatory system.

This reform ensures that vessels operating under the Indian flag adhere to the highest standards of safety, security, and environmental sustainability. It also reinforces India's aspiration to be a leader in "smart shipping," integrating innovation with regulatory excellence.

India has undertaken a series of integrated measures under its smart shipping initiative to modernize maritime operations, promote digital governance, and enhance sustainability. Key interventions include the launch of the e-Samudra platform and revamped DG Shipping website to digitize over 60 maritime services and streamline licensing, vessel registration, and compliance processes. The Directorate General of Shipping's collaboration with the Centre for Development of Advanced Computing (C-DAC) is advancing automation, cybersecurity, and AI integration across maritime administration. Complementing these are national maritime digitalization efforts such as the One Nation–One Port Process (ONOP), the MAITRI Virtual Trade Corridor, and the Sagar Ankalan Logistics Performance Index, all designed to standardize port processes, reduce documentation, and enable real-time cargo visibility. India has also launched the Green & Digital Maritime Corridor with Singapore, alongside port-based renewable projects and hydrogen infrastructure, linking smart technology with environmental goals. Together, these initiatives form the core of India's transition toward a technologically advanced, sustainable, and globally competitive smart shipping ecosystem.

2 Human Element at the Helm: Empowering Seafarers for the Future

2.1 Raising the Bar: Advancing Seafarer Training

Seafarers are the lifeblood of the maritime industry. To navigate the demands of modern shipping, they require skills that blend traditional seamanship with advanced digital literacy. Training institutions across India are increasingly incorporating **simulation technologies**, **virtual reality modules**, and **AI-assisted learning** to prepare seafarers for real-world operational challenges.

These initiatives not only elevate professional competence but also ensure compliance with **Standards of Training, Certification, and Watchkeeping (STCW)** norms, enhancing India's global reputation as a hub for skilled maritime professionals.

2.2 People First: Prioritizing Welfare and Inclusivity

A safe and secure maritime ecosystem is incomplete without addressing the welfare and mental well-being of seafarers. Long durations at sea and limited connectivity can affect morale and performance. Initiatives such as **'Sagar Mein Samman'** underscore the importance of dignity, diversity, and inclusion within the maritime workforce.

As of 2024, women constitute nearly **1.9% of India's active seafarers**—a significant leap in gender representation. Continued support through mentorship programs, wellness initiatives,

and workplace safety measures can further encourage equitable participation in this historically male-dominated sector.

2.3 Global Alignment: Maintaining International Standards

For India to remain competitive, its seafarer training programs must align with **International Maritime Organization (IMO)** conventions and **Maritime Labour Convention (MLC)** requirements. Regular audits, certification updates, and cross-border training collaborations ensure that Indian officers and ratings maintain the highest levels of global competency.

By investing in internationally recognized certification pathways, India enhances both the credibility and employability of its maritime professionals worldwide.

2.4 Pathways to Growth: Building Leadership and Career Mobility

Professional growth and leadership development are key to sustaining a motivated maritime workforce. The **Directorate General of Shipping** has introduced specialized career advancement programs that prepare seafarers for leadership roles onshore and at sea. Structured pathways—ranging from technical specialization to maritime administration—enable professionals to continuously evolve, ensuring that India nurtures not just seafarers, but maritime leaders of tomorrow.

2.5 Culture of Resilience: Promoting Integrity and Accountability

The foundation of maritime excellence lies in the values of resilience, compliance, and ethical conduct. Institutions such as the **DG COMM Centre** serve as national platforms for grievance redressal and regulatory oversight, reinforcing a transparent system of accountability.

By embedding these values across every level of the maritime workforce, India fosters a culture that upholds safety, professionalism, and respect for international maritime law.

3 Conclusion: Steering India's Maritime Future

India's maritime journey is defined not only by its strategic geography and trade potential but also by the people and systems that safeguard its waters. Through the dual focus of **technological modernization** and **human empowerment**, India is steadily shaping a maritime ecosystem that is resilient, future-ready, and globally competitive.

As the "Guardians of the Sea," policymakers, industry leaders, and seafarers share a collective responsibility—to ensure that India's seas remain **safe, secure, and sovereign**. By advancing innovation, strengthening regulatory frameworks, and investing in the welfare of its seafarers, India continues to anchor its maritime destiny on a foundation of excellence, integrity, and enduring security.